UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 161 TO FACILITY OPERATING LICENSE NO. DPR-63

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-220

1.0 INTRODUCTION

By letter dated May 2, 1998, as supplemented by letters dated May 21, and 23 (three letters), 1998, Niagara Mohawk Power Corporation (NMPC or the licensee) proposed a license amendment to change the Technical Specifications (TSs) for Nine Mile Point Nuclear Station, Unit 1 (NMP1). The proposed amendment would change TS 3/4.6.2, "Protective Instrumentation," to reflect modifications to the initiation instrumentation for the Control Room Air Treatment System. It would also change TS 3.2.4a, "Reactor Coolant Activity," and its Bases.

Specifically, TS Tables 3.6.2l and 4.6.2l, "Control Room Air Treatment System Initiation," would be changed to delete the high radiation signal and substitute the following initiating signals from the Reactor Protection System: (1) low-low reactor water level in the reactor vessel, (2) high steam flow in the main steam line, (3) high temperature in the main steam line tunnel, and (4) high pressure in the reactor drywell. TS Table 3.6.2l would specify setpoints for each of these four initiating parameters ($\geq$5 inches-indicator scale, $\leq$105 psid, $\leq$ 200 degrees F, and $\leq$3.5 psig, respectively). TS Table 3.6.2l would indicate for each of the four parameters that the minimum number of tripped or operable trip systems and the minimum number of operable instrument channels per operable trip system are two, and that the four parameters are required to be operable when the reactor mode switch is in the "startup" or "run" positions (but not if in the "shutdown" or "refuel" positions), except that the high drywell pressure signal may be bypassed when necessary for containment inerting. For three of the parameters (low-low reactor water level, high steam flow in the main steam line, and high drywell pressure), TS Table 4.6.2l would require daily sensor checks, quarterly instrument channel tests, and quarterly instrument channel calibrations (except that only the trip circuit need be calibrated and tested at these quarterly frequencies; the primary sensor would be calibrated and tested each operating cycle). For the parameter high temperature in the main steam line tunnel, TS Table 4.6.2l would require an instrument channel test and an instrument channel calibration each operating cycle, not to exceed 24 months. Associated TS "Bases for 3.4.5 and 4.4.5 Control Room Air Treatment System" would also be changed to update the system descriptions consistent with these proposed changes to the automatic initiation circuitry, and to reflect the system's manual start capability. These changes to the TS Bases would include deletion of the statements that (1) the Control Room Air Treatment System is designed "to automatically start upon a receipt of a high radiation signal from one of the two radiation monitors located on the ventilation intake" and that (2) "...air intake radiation monitors will be calibrated and functionally tested each operating cycle, not to exceed 24 months, to verify system performance." TS 3.2.4a would be changed to state that the reactor coolant system radioactivity concentration in water shall not exceed 9.47 (rather than 25) microcuries of total iodine per gram of water. TS Bases 3/4.2.4 would be supplemented

to state that "A more restrictive reactor coolant total iodine limit has been imposed for Control Room habitability purposes only. A limit of 9.47 microcuries per gram is imposed based on the most limiting small break loss-of-coolant-accident (LOCA) outside containment. Provided reactor coolant iodine is maintained at or below this value, the Control Room Air Treatment System would not be required to maintain the radiological effects of the line break below [General Design Criterion] GDC 19 dose limits."

By letter dated May 21, 1998, the licensee responsed to U. S. Nuclear Regulatory Commission (NRC) staff requests for additional information and provided other supplemental information in support of the initial application for amendment, including a discussion of the deficiencies in the existing system design that are being corrected and the emergency circumstances for which the licensee requests the NRC to take prompt action. By letter dated May 23, 1998, the licenssee proposed changes to TS 3.2.4a as described above to impose more restrictive limits on reactor coolant iodine concentrations based upon the licensee's analysis of Control Room exposure due to a small break LOCA outside containment. In a second letter dated May 23, 1998, the licensee responded to NRC staff requests for additional information. In a third letter dated May 23, 1998, the licensee addressed use of potassium-iodide (KI) tablets as a compensatory action and provided a commitment to submit new analyses and evaluations for complying with GDC 19 without reliance on KI tablets.

As discussed in Section 4.0 below, the licensee has recently discovered that the existing initiation circuitry for the Control Room Ventilation System does not ensure adequate protection to the control room operators and has shut NMP1 down until the design is modified, noncompliance conditions are corrected, and the NRC issues a license amendment to change the TSs. Accordingly, this amendment is issued on an emergency basis as provided by 10 CFR 50.91(a)(5).

2.0 DESIGN DESCRIPTIONS

2.1 Existing Design

The Control Room Ventilation System at NMP1 provides general air circulation, heating, and cooling to the main and auxiliary control rooms (control complex). If airborne radiation contamination is detected in the outside air supply, a Control Room Air Treatment System (also known as the Control Room Emergency Ventilation System) will provide filtered air to the control complex. A detailed description of the Control Room Ventilation System may be found in Section III.B of the NMP1 Updated Safety Analysis Report (USAR), including USAR Figure III-14 which is a schematic representation of the system. A brief summary of the system design follows:

The Control Room Ventilation System provides outside air to the control complex. Outside air enters the system through a louvered intake; then passes through redundant air-operated blocking valves in the normal outside air intake duct. Two continuous radiation monitors are located in the outside air intake duct upstream of the blocking valves and provide initiation signals to the Control Room Air Treatment System if radiation levels exceed their setpoint.

After passing through the normal supply blocking valves, the air then passes through the outside air mixing plenum where it is mixed with recirculated air from the control complex. Outside air is for ventilation purposes and to provide makeup for leakage from the control complex. The Control Room Ventilation System maintains a positive pressure in the control complex to prevent the infiltration of radioactive contaminants. After the outside air and recirculated air are mixed,

the mixed air passes through a two-element dust filter and then through redundant cooling coils where it is cooled, as necessary. The control room circulation fan takes suction from the mixed air leaving the cooling coils and discharges the air to the control room complex through ducts. The air then circulates through the control complex before it enters the return ductwork for recirculation and mixes with the incoming outside air.

If high radiation is detected in the outside air intake duct by one or both of the continuous radiation monitors, the normal supply blocking valves will automatically close and one of the two channels of the Control Room Air Treatment System will be initiated. One channel of the system is normally in "Auto" (standby) and the other channel is normally "Off." The emergency supply blocking valve for the initiated channel will automatically open and, when the supply valve is fully open, the associated (same channel) full capacity Control Room Emergency Ventilation fan will automatically start. The fan supplies flow through a high efficiency particulate absolute (HEPA) filter and then through an activated charcoal filter unit. After being filtered, the air is routed to the normal supply duct just upstream of the mixing plenum and is circulated by the control room circulation fan.

Currently, TS Table 3.6.2I, "Control Room Air Treatment System Initiation," specifies a setpoint of "≤1000 CPM" for Parameter (1), "High Radiation Ventilation Intake." This requires the continuous radiation monitors located in the outside air intake duct of the Control Room Ventilation System to initiate the Control Room Air Treatment System at a detector count rate of "≤1000 CPM." The licensee established this setpoint to comply with the radiation dose limits specified in 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 19 and NUREG-0800, "Standard Review Plan [SRP]," Section 6.4 for control room habitability during an accident, including a LOCA. The dose limits for an individual in the control room for any postulated design basis accident are 5 rem gamma to the whole body, 30 rem to the thyroid, and 30 rem beta to the skin. In the event of an accident, timely initiation and proper operation of the Control Room Air Treatment System would minimize the amount of airborne radioactivity entering the control room.

2.2 Proposed Design

The licensee proposes to modify the initiation circuitry of the Control Room Air Treatment System so as to automatically initiate upon either a main steam line break (MSLB) or LOCA signal. Spare contacts from the Reactor Protection System (RPS) logic circuits would be used to provide the initiation signals. Specifically, automatic initiation of the system in the event of an MSLB would be based upon high flow in the main steam line or high temperature in the main steam line tunnel, while automatic initiation of the system in the event of an LOCA would be based upon high pressure in the drywell or low-low water level in the reactor vessel. The licensee states that automatic initiation based upon high radiation would be retained; however, the setpoint would be significantly reduced and the initiation function and associated surveillance requirements would be removed from the TSs.

3.0 EVALUATION

The licensee evaluated the radiological doses to the NMP1 control room operators based upon postulated accidents which might occur at NMP1, NMP2, and the adjacent James A. FitzPatrick Nuclear Power Plant (FitzPatrick). The accidents which the licensee analyzed included the LOCA, MSLB, the fuel handling accident (FHA), and the rod drop for NMP1 and NMP2, the small break LOCA for NMP1, the instrument line break for NMP2 and the LOCA, FHA, rod drop and MSLB for FitzPatrick. The purpose of the licensee's dose assessment was to

demonstrate (1) that the removal of the radiation monitor from the TS would not result in the doses to the control room operators exceeding the guidelines of GDC 19 and (2) that the addition of the MSLB and LOCA signals to initiate operation of the control room emergency ventilation system would provide protection to the control room operators to limit the dose to GDC 19 guidelines. The results of the licensee's calculations showed that, for some accidents, the control room operators would not receive a dose that would exceed the guidelines of GDC 19, even if the NMP1 Control Room Emergency Ventilation System were not activated. For some other accidents, the licensee's calculations showed that the initiation of the Control Room Emergency Ventilation System was required in order to limit the doses to be within the guidelines of GDC 19.

The NRC staff performed confirmatory calculations to determine the efficacy of the licensee's conclusions. The NRC staff calculations and review of the licensee's assumptions identified areas that called into question the licensee's conclusions. Areas of concern involved the licensee's analytical assumptions versus information contained in the USAR, TS, and NUREG-0737 (TMI Action Item) III.D.3.4 requirements. The staff concluded that the degree of these differences was of such magnitude that, for certain accidents, the guidelines of GDC 19 could not be met without the utilization of compensatory actions on the part of the control room operators. In a letter dated May 23, 1998, the licensee agreed to implement, through their operational procedures, the use of KI tablets for the control room operators in the event of a radiological accident. These compensatory actions would be utilized pending resolution of the NRC staff's concerns. In addition, the licensee committed to submit an application for license amendment, including supporting analyses and evaluations within 6 months. This amendment application would contain the proposed methods for compliance with GDC 19 dose guidelines under accident conditions based upon system design and without reliance upon the use of KI. The licensee has indicated that procedural controls currently exist to provide direction in the determination of need and administration of KI to NMP1 control room operators. Thus, the availability of KI to control room operators is currently and will continue to be assured. Based upon the licensee's commitment, the NRC staff has reasonable assurance that the NMP1 control room operators will be protected in accordance with GDC 19 dose limits.

4.0 EMERGENCY CIRCUMSTANCES

On March 28, 1998, following a partial loss of offsite power at NMP2, the licensee discovered that a time delay feature in the design of the NMP2 ventilation filters actuation circuitry had not been analyzed to determine its effect upon the response of radiation detectors and initiated a design review of the NMP1 Control Room Emergency Ventilation System to determine if a similar condition existed at NMP1. During the course of this review, the licensee determined that (1) contrary to a commitment in letters to the NRC dated January 31 and March 19, 1984, the NMP1 Control Room Air Treatment System would not automatically initiate during an MSLB or an LOCA, and (2) initiation of the NMP1 Control Room Air Treatment System at the current radiation monitor setpoint of $\leq$1000 CPM, as required by TS Table 3.6.2I, is not sufficient for compliance with GDC 19 limits for radiological protection of the control room operators. Consequently, on April 21, 1998, the licensee declared the Control Room Air Treatment System inoperable and notified the NRC that a 7-day limiting condition for operation had been entered as specified by TS 3.4.5. On April 27,1998, the licensee informed the NRC that resolution of the inoperability condition would involve modifications more extensive than mere setpoint adjustments, that these modifications should not be implemented while NMP1 is operating, and that the licensee was considering filing an application for an emergency license amendment, as provided by 10 CFR 50.91(a)(5), to allow the modifications to be implemented and the plant restarted after a 7-day

outage. NMP1 was shut down on April 28, 1998, in accordance with TS 3.4.5. On May 2, 1998, the licensee filed an application requesting that the NRC amend the NMP1 license by May 8, 1998, on an emergency basis because "resumption of operation cannot occur until NRC approval of the proposed change."

As of May 8, 1998, the licensee had not completed the modifications and on May 11, 1998, called the NRC staff to explain why. The licensee explained that since the application for amendment was issued, a project team, consisting of licensee engineers and engineers from Sergeant & Lundy, had completed an independent design review to determine compliance of plant activities (operations, maintenance, testing, and engineering) with the Control Room Air Treatment System's design and licensing bases. The project team identified noncompliances with the system's design and licensing bases, mostly involving the lack of system redundancy and lack of documentation regarding the system's ability to maintain a habitable control room environment after an accident concurrent with a single failure in the system. The licensee said that modifications to correct these deficiencies, although not affecting the TS changes requested in the proposed license amendment, had been added to the scope of work to be completed before the system would be declared operable. Consequently, the earlier estimate of 7 days had changed and the licensee estimated that the modifications would be completed in about 2 to 3 weeks. Based on the revised schedule for the expanded scope of work, the NRC staff determined that the emergency circumstances discussed in the application for amendment should be considered exigent circumstances.

Therefore, the Commission noticed the licensee's May 2, 1998, application for amendment in the Federal Register on May 19, 1998 (63 FR 27601), at which time the Commission stated that exigent circumstances exist, as provided by 10 CFR 50.91(a)(6), in that the full 30 days normally provided for public comment was not available before NMP1 would be ready to resume power operation. In the notice, the Commission also made a proposed finding that the amendment involved no significant hazards consideration.

On May 22, 1998, the licensee informed the Commission of improvements in its schedule for completing the modifications and that NMP1 would be ready to resume operation by May 24, 1998. Accordingly, the NRC staff finds that an emergency situation exists in that failure to issue the proposed amendment consistent with the licensee's modification schedule would prevent resumption of operation. The existing deficiencies in the ventilation system design that were the basis for the licensee's application for license amendment were discovered as a result of the licensee's design review and the licensee could not reasonably have anticipated those deficiencies in advance of that review. The licensee filed an application for license amendment in a timely fashion, and therefore, did not create the emergency circumstances by failing to file in a timely manner. The additional system deficiencies, discovered by the licensee after the application for amendment was filed, resulted from a project team review that was initiated and conducted expeditiously by the licensee. The NRC staff determined during its review that an additional change for TS 3.2.4a and a license condition were required in order to appropve the amendment. Considering the corrective nature of the proposed changes which will ensure that the control room would remain habitable in the event of an accident, and since the proposed changes do not involve significant hazards considerations, the NRC concludes that prompt action pursuant to 10 CFR 50.91(a)(5) is warranted.

5.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

As required by 10 CFR 50.91(a), the licensee has provided its analysis of the issue of no significant hazards consideration, which is presented below:

1. The operation of Nine Mile Point Unit 1, in accordance with the proposed amendment, will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   ...The proposed modification and associated TS changes involve a system that is intended to detect the symptoms of certain events or accidents and initiate mitigative actions (i.e., the Control Room Air Treatment System). Accordingly, the proposed changes do not affect the probability of any accident initiators previously evaluated. Therefore, the proposed changes will not result in a significant increase in the probability of any accidents previously evaluated.

   Currently, TS Table 3.6.2I, "Control Room Air Treatment System Initiation," specifies a setpoint of "≤1000 CPM" for Parameter (1), "High Radiation Ventilation Intake." This requires the continuous radiation monitors located in the outside air intake duct of the Control Room Ventilation System to initiate the Control Room Air Treatment System at a detector count rate of "≤1000 CPM." The setpoint was established to comply with the radiation dose limits specified in 10 CFR 50, Appendix A, General Design Criterion (GDC) 19 and NUREG-0800, "Standard Review Plan [SRP]," Section 6.4 for control room habitability during an accident, including a Loss of Coolant Accident (LOCA). In the event of an accident, timely initiation and proper operation of the Control Room Air Treatment System minimizes the amount of airborne radioactivity entering the control room. However, based on the results of a current study, initiation of the Control Room Air Treatment System at this setpoint does not provide assurance that personnel occupying the control room under the most limiting Main Steam Line Break (MSLB) accident assumptions would not receive radiation exposures in excess of the GDC 19 and SRP 6.4 limits. It was further determined that, contrary to a 1984 commitment, the Control Room Air Treatment System would not automatically initiate during a LOCA.

   To correct this condition, a modification is proposed that will automatically initiate the Control Room Air Treatment System on either a MSLB or LOCA signal. Spare contacts from the RPS logic circuits will be used to provide the initiation signals. Specifically, MSLB automatic initiation of the system will be on main steam line high flow or main steam line tunnel high temperature, and LOCA automatic initiation of the system will be on high drywell pressure or low-low reactor vessel water level. Implementation of this modification will provide automatic initiation of the Control Room Air Treatment System at the onset of both a MSLB and a LOCA, as previously committed.

   The MSLB accident has been evaluated for full power operating conditions where radioactive gases released from the turbine building could be drawn into the Control Room Ventilation System and accumulate in the control room. Engineering calculations show that the Control Room Air Treatment System would maintain the dose to the control room operators below the GDC 19 and SRP 6.4 limits during these releases, and the addition of an anticipatory automatic initiation on a MSLB signal (main steam line high flow or main steam line tunnel high temperature) provides assurance that the consequences of the MSLB accident are bounded by the analysis.

The LOCA analysis assumes that radioactive gases are released from the elevated stack and are then drawn back down into the Control Room Ventilation System intake duct. Analysis shows that for the bounding condition, the accumulated dose in the control room for a minimum of 30 days would not be detected by the Control Room Air Treatment System radiation monitors, even at a significantly reduced setpoint. Consequently, the radiation monitors cannot be relied upon to initiate the Control Room Air Treatment System in the event of a LOCA. As a result, an anticipatory automatic initiation of the Control Room Air Treatment System on a LOCA signal (high drywell pressure or low-low reactor vessel water level) is proposed to be added to provide assurance that personnel occupying the control room under the most limiting LOCA assumptions will not receive radiation exposures in excess of the GDC 19 and SRP 6.4 limits.

NMPC has also proposed to delete the requirement to have the Control Room Air Treatment System automatically initiate on a high radiation signal when the reactor mode switch is in the "Refuel" position. This change is acceptable based on 1) neither a LOCA or MSLB is assumed to occur in refuel; 2) for accidents assumed to occur during refueling (fuel handling accident), GDC 19 and SRP 6.4 limits are met without the Control Room Air Treatment System; and 3) the Control Room Air Treatment System can be manually initiated.

In summary, the proposed changes for the Control Room Air Treatment System initiation channels will assure that the NMP1 control room operators will not receive radiation exposures in excess of the limits delineated in GDC 19 and SRP 6.4. Accordingly, the operators will be able to respond to and mitigate the consequences of anticipated accident scenarios. Therefore, the proposed changes will not involve a significant increase in the consequences of an accident previously evaluated.

2. <u>The operation of Nine Mile Point Unit 1, in accordance with the proposed amendment, will not create the possibility of a new or different kind of accident from any accident previously evaluated</u>.

   ...The proposed changes do not introduce any new accident initiators and do not involve any alterations to plant configurations which could initiate a new or different kind of accident. The actuation circuit of the Control Room Air Treatment System actuation logic does not control or interface with any primary reactor processes. Addition of the MSLB logic and the LOCA logic will ensure that the Control Room Air Treatment System initiates such that habitability of the control room is not compromised. No new failure modes to existing systems or equipment important to safety are created by this change. Post-installation testing will confirm that the new logic will have no effect on other safety-related circuits and TS required surveillance testing will routinely confirm operability of the Control Room Air Treatment System. Therefore, the changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. <u>The operation of Nine Mile Point Unit 1, in accordance with the proposed amendment, will not involve a significant reduction in a margin of safety</u>.

   The proposed changes to Sections 3.6.2 and 4.6.2 incorporate modifications to the initiation instrumentation for the Control Room Air Treatment System.... As a result of these changes, the requirement to have the Control Room Air Treatment System

automatically initiate on a high radiation signal when the reactor mode switch is in the "Refuel" position has been deleted....

The addition of the trip circuit logic from the MSLB accident as well as from the LOCA circuits assures that the control room operator will not be exposed to radiation limits in excess of GDC 19 or SRP 6.4 limits. Additionally, the initiation signal will be automatic at the onset of both accidents, which improves the response time of the Control Room Air Treatment System to the MSLB accident and the LOCA. NMPC has proposed to delete the requirement to have the Control Room Air Treatment System automatically initiate on a high radiation signal when the reactor mode switch is in the "Refuel" position. This change is acceptable based on 1) neither a LOCA nor MSLB is assumed to occur in refuel; 2) for accidents assumed to occur during refueling (fuel handling accident) GDC 19 and SRP 6.4 limits are met without the Control Room Air Treatment System; and 3) the Control Room Air Treatment System can be manually initiated.

In summary, the proposed changes will assure that the Control Room dose established in GDC 19 and SRP 6.4 will not be exceeded. Therefore, the proposed activity does not involve a significant reduction in a margin of safety.

The NRC staff has reviewed the licensee's analysis, including the licensee's conclusion in a letter dated May 23, 1998, that the change to TS 3.2.4a to impose a more restrictive limit on reactor coolant iodine concentration satifies the above criteria and does not change the above findings. Based on this review and NRC staff conclusions in Section 3.0 above, the NRC staff concludes that the three standards of 50.92(c) are satisfied. Therefore, the NRC staff concludes that the amendment request involves no significant hazards consideration.

6.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New York State official was notified of the proposed issuance of the amendment. The State official (Mr. J. Dunkelburger) commented on May 20, 1998, that the licensee's application of May 2, 1998, failed to address the consequences to NMP1 operators that could result from a radiological release at NMP2. The NRC Project Manager replied that the NRC staff was reviewing additional information from the licensee to this end and would address these consequences in the staff's safety evaluation that accompanies the amendment. As discussed in Section 3.0 above, the NRC staff finds that NMP1 operators will not receive doses in excess of 10 CFR 50.19 limits in the event of a radiological release at NMP2.

7.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment. The Commission has made a final no significant hazards finding with respect to the amendment.

8.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) the amendment does not (a) significantly increase the probability or consequences of an accident previously evaluated, (b) increase the possibility of a new or different kind of accident from any previously evaluated, or (c) significantly reduce a safety margin and, therefore, the amendment does not involve a significant hazards consideration;(2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (3) such activities will be conducted in compliance with the Commission's regulations, and (4) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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